7-7-2022

Effect of a Turn Clock on Hospital-Acquired Pressure Injury Incidence

Sydney Warren
University of Missouri-St. Louis, skwwx2@umsystem.edu

Effect of a Turn Clock on Hospital-Acquired Pressure Injury Incidence

Sydney K. Warren

Bachelor of Science in Nursing, Truman State University, 2018

A Dissertation Submitted to The Graduate School at the University of Missouri-St. Louis
in partial fulfillment of the requirements for the degree
Doctor of Nursing Practice with an emphasis in Family Nurse Practitioner

August 2022

Advisory Committee

Vanessa Loyd, DNP, Ph.D., RN
Chairperson

Jennifer Vines, DNP, RN

Jessica Donnelly, MHA, BSN, RN

Abstract

Problem: Hospital-Acquired Pressure Injuries (HAPIs) are the only quality metric increasing in incidence and are preventable. HAPIs are wounds to bony prominences during a hospitalization and can increase hospital costs, morbidity, and mortality. HAPIs could be prevented through interventions, including repositioning patients every 2 hours and using a turn clock method. The aim of this quality improvement (QI) pilot project was to decrease HAPI incidence.

Methods: A turn clock method was implemented on a general medicine floor at a mid-sized, suburban medical center utilizing a descriptive retrospective observational design. Data was collected for the pre-intervention timeframe from June through August 2021 and the post-intervention timeframe from October through December 2021. A retrospective medical record review was used to observe HAPI incidence, turn clock usage, 2 hour turning compliance, and demographic variables.

Results: HAPI incidence decreased post-intervention to 0.271% from the pre-intervention of 0.619%. In pre-and post- incidences, a two-proportions *z*-test revealed the differences were not statistically significant (p=.299). The results of a reduction of HAPI occurrences were clinically significant. Out of the 46 individuals in the sample, two individuals were turned every two hours or 12 times in 24 hours. However, the average number of turns in the patients who had a turn clock was slightly higher than those without.

Implication to practice: Ongoing QI analysis could be performed. Usage of preventative interventions, such as turn teams and turn clocks, may well decrease incidences of HAPIs. Explore the possibility of creating a role designated to ensure compliance.

Effect of a Turn Clock on Hospital-Acquired Pressure Injury Incidence

Hospital-acquired pressure injuries (HAPIs) are a quality indicator and considered preventable in acute healthcare settings. HAPI is an injury to the skin or underlying tissue during an inpatient hospitalization (Rondinelli et al., 2018). Despite this, approximately 2.5 million individuals develop HAPIs in the United States each year. Furthermore, HAPIs cause 60,000 deaths annually (Padula & Delarmente, 2019). The development of HAPIs occurs due to friction, shear, pressure, or a combination of these factors. Current evidence suggests failing to turn patients is a problem and can lead to HAPIs in vulnerable individuals in acute care settings (Wassel et al., 2020). Additional factors leading to the development of HAPIs include advancing age, illness severity, nutritional status, immobility, perfusion, hematological measures, and the presence of diabetes (Rondinelli et al., 2018). A staging system is used to describe the severity of HAPIs as they develop and evolve. The staging system progresses from the mildest pressure injury at stage one to the deepest, most serious pressure injury at stage four (Rondinelli et al., 2018).

The continued incidence of HAPI development in acute care settings in the United States led the Centers for Medicare and Medicaid Services (CMS) to initiate repercussions to hospitals where these events occur (Wassel et al., 2020). To help alleviate this issue and hold acute care settings accountable for the development of healthcare-acquired conditions, CMS has decreased reimbursement for HAPIs. This places the financial burden on the hospitals where these events take place. CMS calls HAPIs at a stage three or stage four thickness “never events” (Rondinelli et al., 2018). Unlike stage one and stage two of HAPIs, “never events” are reported to CMS when they

occur in the acute care setting. HAPIs are expensive, even when they do not progress to a stage three or stage four pressure injury. Padula and Delarmente (2019) used an economic simulation method to estimate the national cost of HAPIs in the United States and found these costs could exceed 26.8 billion dollars annually.

In addition to the financial burden of HAPIs, the occurrence of adverse health effects due to HAPIs is another issue altogether. Wassel et al. (2020) found HAPIs are related to higher mortality risks and decreased quality of life. As the stage of the HAPI increases, adverse effects continue through increased hospital readmissions and other healthcare-acquired conditions. Specifically, Wassel et al. (2020) found increasing HAPI severity led to a greater risk of 30-, 60-, and 90-day readmissions by 1.5 to 2 times. The risk of developing other healthcare-acquired conditions, such as hospital-acquired pneumonia, venous thromboembolism, and urinary tract infections also increased as HAPI severity increased.

The European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel, and Pan Pacific Pressure Injury Alliance [EPUAP/NPIAP/PPPIA] (2019) developed a guideline for the prevention and treatment of HAPIs. This guideline revealed the importance of repositioning patients frequently, using heel protectors, using prophylactic dressings on high-risk skin areas, utilizing a multidisciplinary team, and using correct bed support surfaces (EPUAP/NPIAP/PPPIA, 2019). An evidence-based scale predicting HAPI risk is also recommended, such as the Braden scale. The Braden scale has six subscales, and these subscales are measured either one to four or one to three. The lower the overall score, the higher the risk of developing a HAPI. Despite current evidence and prevention techniques, HAPIs continue to occur (Wassel et al.,

2020). In fact, with an increase in the prevalence of 6%, HAPIs are the only hospital-acquired condition that has risen above the 2014 baseline rates (Agency for Healthcare Quality and Research, 2020).

On the general medicine floor at a mid-sized, Midwestern, suburban medical center, HAPIs have increased over the last year. The purpose of this evidence-based quality improvement (QI) pilot project is to evaluate the impact of change after implementation of a turn clock intervention for patients aged 60 to 90 years old with a Braden score of 18 or lower with limited mobility and without a pre-existing pressure injury admitted to the general medicine floor. The evidence-based practice (EBP) framework to guide this project is the Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care (Iowa Model Collaborative, 2017). This project aims to reduce HAPI incidence to one HAPI in 3 months. The primary outcome measure is the number of HAPI incidence, and the secondary outcome measures are turn clock intervention utilization and turning compliance every 2 hours in patients with Braden scores of 18 or lower. The question for study is: In adults aged 60 to 90-years-old, how does implementing a turn clock method effect HAPI incidence on a general medicine unit over 3 months?

Review of Literature

The search engines utilized for the literature search included PubMed, CINAHL, and Medline (EBSCO). The key search terms and phrases used in the literature search were *pressure injury prevention, pressure ulcer prevention, turning, interventions to decrease HAPI, adults, reminders, AND repositioning OR positioning OR turning*. Initially, 47,245 results were identified based on the search terms and phrases stated

above. The inclusion criteria for the literature search included linked full text, English language, published date after 2015, patients aged 60-years-old to 90-years-old, immobility, a Braden score of 18 or lower, and an inpatient medical setting. The exclusion criteria for the literature search included publications without a linked full text, in a language other than English, published during the year 2015 or earlier, patients younger than 60-years-old, patients older than 90-years-old, have a Braden score greater than 18, mobility present, and had a setting in the intensive care setting. With the inclusion and exclusion criteria applied, 78 publications resulted in the literature search. A total of 11 peer-reviewed articles were chosen to be included in this review of the literature. Out of the 11 articles chosen, there are: Three systematic reviews, one randomized controlled trial (RCT), one non-experimental study, two qualitative studies, one clinical practice guideline, and three quality improvement projects.

Lovegrove et al. (2020) posit HAPI prevention can be identified in three steps, which are conducting a risk assessment, planning or prescribing an intervention, and implementing the appropriate interventions. Additionally, their study found a disconnect between prescribing HAPI prevention interventions and implementing them while conducting an exploratory descriptive study (Lovegrove et al. 2020). This study concluded HAPI incidence can be decreased through the appropriate implementation of preventative interventions following the prescription of these interventions in compliance with the patients' determined pressure injury risk assessment. Similarly, Chaboyer et al. (2017) found patients in Australian hospitals were not consistently receiving pressure injury prevention strategies during a longitudinal study. However, a limitation to this study possibly affecting the results was the patients’ risk of developing pressure injuries

could have changed during their time in the study. In reviewing the findings from Chadboyer et al. (2017) and Lovegrove et al. (2020), education about the steps to prevent HAPI development ensures compliance with intervention implementation and has the potential to decrease the incidence of HAPIs in acute care settings (Chadboyer et al., 2017; Lovegrove et al., 2020).

In comparison to the findings in the above studies, ensuring HAPI prevention includes knowledge about implementing preventative practices after identification of their need. Gaspar et al. (2019) revealed the failure to practice daily routine care using pressure injury prevention strategies (i.e. turning patients, specialty mattress usage, protective foam devices) can contribute greatly to the rise in HAPI incidence throughout the world (Gaspar et al., 2019). The evidence supports interventions can decrease the development of HAPIs, yet healthcare personnel do not always follow the guidelines and evidence-based practice methods for the prevention of HAPIs (Gaspar et al., 2019). To determine why this phenomenon exists, Jiang et al. (2020) studied nurses' attitudes, knowledge, and behaviors towards pressure injury prevention in China utilizing a cross-sectional study design. In addition, determined attitudes, knowledge, and behavior are important factors in motivating staff to promote pressure injury prevention. Jiang et al. (2020) found that Chinese nurses had unsatisfactory knowledge and attitudes towards pressure injury prevention, but their behavior was satisfactory. However, a gap in Jiang et al. (2020) study did not mention the motivation of staff in promoting pressure injury prevention. In resemblance, Dalvand et al. (2018) determined nurses' knowledge of pressure injury prevention using the Pressure Ulcer Knowledge Assessment Tool (PUKAT). In their study, knowledge was less than the recommended level of 60% based

on the PUKAT scores. These results concluded the need for nursing education to improve pressure injury prevention. There is a consensus about leadership, education, and training enhancing nurses' knowledge and attitudes to further increase pressure injury prevention practices and compliance (Dalvand et al., 2018; Gaspar et al., 2019; Jiang et al., 2020).

To further improve nurses' knowledge, attitudes, and interventions to decrease HAPI incidences need to be explored. Evidence-based interventions to decrease HAPIs include education for healthcare personnel, prophylactic dressings, repositioning, early mobilization, support surfaces, skin care prevention, and reminders for these interventions (Dalvand et al., 2018; EPUAP/NPIAP/PPPIA, 2019; Gaspar et al., 2019; Jiang et al., 2020). Gaspar et al. (2019) systematic review found that evidence-based interventions work better when utilized together or as a bundle, rather than as individual interventions. Additionally, Lovegrove et al. (2020) recommended implementing a HAPI prevention bundle to decrease the incidence of HAPIs in acute care settings. Gupta et al. (2020) supported the Gaspar et al. (2020) findings by conducting a QI project that initiated a Surface, Skin Inspection, Keep moving, Incontinence, and Nutrition bundle to decrease HAPIs by 60% in a 2 year timeframe. There was an 83% reduction in HAPI incidence over 2 years. In addition, HAPI prevalence decreased to 2.0 per 100 patients showing a 73.4% reduction. However, a limitation to this QI project was a failure to differentiate the implementation of the bundle for each unit involved in the project. The project sustained the reduction of HAPI incidence and prevalence for four years exemplifying the sustainability of implementing this HAPI prevention initiative (Gupta et al., 2020).

While the evidence supports pressure injury prevention bundles, debates exist on the recommended best frequency of repositioning patients at risk for developing HAPIs. Gillespie et al. (2020) in their Cochrane review found inconclusive evidence supporting the use of one repositioning frequency or position over another. The frequencies assessed were repositioning patients at risk for HAPIs every 2-, 3-, 4-, or 6-hours. The results were inconclusive in the frequency hours of repositioning patients due to the limited evidence included in the RCT within the review. A limitation in this current systematic review is the need for more RCTs to determine the best frequency for repositioning patients to prevent HAPIs. However, the EPUAP/NPIAP/PPPIA (2019) guideline reported a strong positive recommendation meaning "definitely do it" for repositioning patients who are at risk of developing a pressure injury or HAPI on an individualized schedule. Individualized turning schedules are recommended, De Meyer et al. (2019) reported there is no decision-making tool for determining individualized repositioning frequencies. In their systematic review, Gaspar et al. (2020) recommended the 2 hour interval for repositioning patients due to this frequency being the standard of care. Additionally, the frequency of turning may be different depending on the patient's medical condition and support surface used, but no guidance for determining these variables was outlined.

Whereas the frequency of turning is under debate, there are studies evaluating interventions to improve patient repositioning compliance as an evidence-based intervention to decrease HAPI incidence. De Meyer et al. (2019) tested the effect of a turning aid and tailored repositioning on nursing compliance of turning patients, patient's body postures after turning, incidences of pressure injuries and incontinence-associated dermatitis, patient preferences, nurse's preferences, and costs. In this study, De Meyer et

al. (2019) found pressure injury incidence decreased, nursing compliance with repositioning patients increased, and the nursing response was positive to these turning modalities. This was the first study conducted in determining the effectiveness of a turning aid and tailored repositioning showing continued research on these turning interventions is needed. Similarly, Cyriaks and Spencer (2019) performed a quality improvement project on a medical-surgical pulmonary unit to decrease HAPI incidence and increase every 2 hour turning compliance in patients at risk for HAPIs utilizing a Turn Team Program (TTP). The quality improvement project resulted in a 75% reduction in HAPIs and 100% compliance with repositioning patients every 2 hours who were at high risk of developing a HAPI. This initiative showed sustainability and staff acceptance of the TTP over six months with positive results in the outcome measures. However, the TTP had limitations, such as miscommunication between the nurses and the patients on the importance of repositioning every 2 hours and the nursing staff being too reliant on patient reports of turning (Cyriaks & Spencer, 2019). Altogether, De Meyer et al. (2019) and Cyriaks and Spencer (2019) determined that HAPI incidence reduction occurs through repositioning techniques and increased nursing compliance with repositioning high-risk patients, further research validating these results is lacking.

Reminder strategies for decreasing HAPI prevalence are another studied intervention. The EPUAP/NPIAP/PPPIA (2019) guideline reported a weak positive recommendation meaning “probably do it” for implementing a reminder strategy to increase repositioning compliance for patients at risk of developing a HAPI. Gaspar et al. (2020) recommended a reminder system for repositioning patients at high risk of developing HAPIs every 2 hours to decrease HAPI incidence. However, emphasis was

placed on this initiative working best when combined with other evidence-based interventions. Following these recommendations, Gupta et al. (2020) implemented turning clocks and pressure injury incidence calendars as a reminder strategy in all units at Heart Hospital in Doha, Qatar with an 83% reduction of HAPIs over 2 years. Similarly, in their study at two Kaiser Permanente hospitals, Sheih et al. (2018) also determined positive results with implementing a pink paper reminder system. Two parts were implemented in this QI project. The first part was the development of a new pink paper criteria to function as the risk assessment tool. The second part was to place a pink paper sign reporting at-risk skin at the head of the bed in all patients' rooms scoring the qualifying criteria. The second part also included ordering HAPI preventative measures, including turning patients every 2 hours (Sheih et al., 2018). This reminder system produced a 67% reduction in HAPI incidence amongst all adult patients over four years. A limitation to this quality improvement project was the risk assessment only identified those individuals at extremely high risk of developing HAPIs and not all the patients rated high-risk using the Braden scale. However, both projects utilized reminder systems in conjunction with turning patients every 2 hours with a result of decreasing HAPI incidence.

QI projects have demonstrated the effectiveness of implementing reminder strategies for HAPI preventative practices. Specifically, the aforementioned projects showed improvement in repositioning compliance in patients at high risk for developing HAPIs. To effectively conduct a QI project, a framework is needed to guide the process and ensure accurate results. The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care will guide this clinical scholarship project (CSP)

(Iowa Model Collaborative, 2017). This evidence-based practice (EBP) framework explains the process for leading a change and implementing EBP. This model follows an algorithm to identify an area of growth within an organization and when to implement EBP to lead this change. The steps within this model include identifying triggers or opportunities for change, stating a purpose for change, determining if the change is a priority, forming teams, searching for literature to support the change, appraising the literature, designing the practice change, piloting the practice change, assessing results, and sustaining the change if the results are positive (Iowa Model Collaborative, 2017). A practice change is needed in the general medicine unit to further prevent HAPI occurrences exemplifying why this practice change is a priority. The use of this framework will develop cost-effective, useful, and practical results.

The current evidence on HAPI prevention shows utilizing multiple prevention strategies or a prevention bundle will decrease HAPI incidence the most significantly. Though it is recommended to implement multiple prevention strategies to prevent HAPIs, nursing compliance with these interventions is lacking. Increasing nurses' knowledge of pressure injury prevention and improving the implementation of preventative interventions will decrease the occurrence of HAPIs in hospital settings. When focusing on repositioning patients as a recommended practice to decrease HAPI incidence, evidence is unclear on what turning frequency has the largest impact on HAPI prevention and reduction. An individualized turning schedule based on patients' medical conditions and other variables is recommended, but no guidance on utilizing this recommendation in practice is available. QI projects have determined the positive impact of reminder strategies in decreasing HAPI incidence and improving repositioning compliance. A gap

in the literature reveals the need for more high-quality research regarding the frequency of repositioning patients at risk of developing HAPIs and a decision-making tool for determining individualized turning schedules.

Methods

Design

This evidence-based pilot QI project used a descriptive observational design. Quantitative data regarding HAPI incidence was collected via retrospective medical record review for June, July, and August 2021. After initiation of the turn clock method, data collection used retrospective medical record review to identify the HAPI incidence rate and every 2 hour turning compliance for the months October, November, and December 2021.

Setting

This project took place at an American Nurses Credentialing Center (ANCC) Magnet-designated mid-sized, suburban medical center. This medical center was a voluntary nonprofit organization. This medical facility had 426 staffed beds. The setting unit within this medical center was the general medicine unit with typically 43 staffed beds. Staffed medical beds have varied in this unit following the COVID-19 pandemic and the need for medical COVID-19 beds. This unit had an adult population with varying medical diagnoses and comorbidities. The hospitalist service line provided physician oversight to these patients.

Sample

This project used a purposeful sample including all patients aged 60-years-old to 90-years-old admitted to a general medicine floor with a Braden score of 18 or lower and

are immobile. The patients included in the sample had an absence of a documented pressure injury on admission. Patients younger than 60-years-old, older than 90-years-old, had a Braden score higher than 18, are mobile, and had a pressure injury present on admission were excluded from the sample.

Data Collection/Analysis

The data collection consisted of a retrospective medical record review for HAPI incidence and every 2 hour turning compliance for the specified sample. Two-hour turning compliance was collected as the number of turns completed in the most recent 24-hour period. Participant data included Braden score and the number of turns completed and documented in a 24-hour period. Additional participant data included demographic data. The demographic data collected included age, gender, race/ethnicity, admitting diagnosis, comorbidities, length of stay (measured in days), mobility status, and other HAPI preventative practices. Beginning in October, the charge nurse used the Reports tab in Epic to run a daily chart audit called “IP Patients with At Risk Skin Scoring”. This report was printed and maintained in a confidential binder at the central nurses’ station on the general medicine unit. After approvals were obtained, the Doctor of Nursing Practice (DNP) candidate acting as the primary investigator (PI) conducted retrospective chart audits determining the rate of HAPI incidence and every 2 hour turning compliance using the patient lists in the confidential binder. This information was obtained for the three months following the turn clock implementation, including October, November, and December 2021. Also, following the initiation of the turn clock, the charge nurse conducted visual weekly audits to determine the use of a turn clock visual aid for the qualifying patients. The PI transferred the data collection to an Excel spreadsheet kept on

her password-protected personal laptop as shown in Appendix A and Appendix B. Descriptive statistics analyzed the data using Intellectus Statistics to determine 2 hour turning compliance and its relationship to demographic variables and the number of turns completed.

Approval Processes

Formal, written approval was sought and obtained by the participating medical center's Institutional Review Board (IRB) on 2/2/2022, the student's doctorated committee, and the school institution's IRB on 2/4/2022 (see Appendix C).

Procedures

HAPI incidence on a general medicine floor at a suburban medical center was above benchmark for the previous 2 years. The benchmark for HAPIs at the location of this QI project is zero HAPI occurrences. Additionally, the healthcare system of this participating facility had a mandate to lower HAPIs by 90% by 2024 exemplifying the urgency of this issue. This mandate also follows the Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Healthcare through identifying a triggering opportunity aligning with the organization's initiative (Iowa Model Collaborative, 2017). Through analysis of the HAPI occurrences, nursing staff found an area of improvement to be every 2 hour turning compliance. Other preventative practices currently in place at the facility consist of specialty mattresses, moon boots, allevyn pressure dressings, barrier cream, every shift skin assessment, and a nutrition consult. The analysis of HAPI occurrences revealed compliance with these other preventative practices. Following the next steps of the Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Healthcare, the nursing staff proposed the purpose of the QI project, and they deemed the

project a priority (Iowa Model Collaborative, 2017). Specifically, a team of key stakeholders consisting of the general medicine Unit Nursing Practice Council (UNPC), convened. A few nursing staff within this council communicated a desire to trial a turn team program to increase turning compliance. However, the majority of the UNPC did not agree to this practice change. UNPC reviewed the unit's current process of turning patients at risk for developing pressure ulcers every 2 hours. UNPC decided to trial a turn clock reminder system to decrease HAPI incidence and increase every 2 hour turning compliance. As the Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Healthcare stated, determine if there is sufficient evidence for the project and if so, then design and implement the practice change (Iowa Model Collaborative, 2017). In congruence, the literature search showed the turn clock method appropriate for a pilot on general medicine. Dissemination of education on turn clock use was communicated to all staff at the August 2021 staff meeting. The turn clock was implemented on August 30th, 2021.

Results

Demographics

The sample included 46 individuals between the ages of 60-years-old to 90-years-old. As shown in Table 2, the average age of the participants in the sample was 75.67 years old. Table 1 shows out of the 46 participants in the sample, 20 were male (43.48%) and 26 were female (56.52%). The primary race/ethnicity present in the sample population was white (78.26%), followed by black (15.22%). The mobility of the participants was determined by the charted Bedside Mobility Assessment Tool (BMAT) scores in the electronic medical record. Immobile patients have either an orange or red

BMAT score. The sample included 22 participants (47.83%) with an orange BMAT and 24 participants (52.17%) with a red BMAT. The sample's average Braden score was 14.89 and the average length of stay was 13.96 days as shown in Table 2.

HAPI Incidence

Before the intervention, there were five HAPI occurrences out of 807 patient admissions during June, July, and August 2021. The pre-intervention HAPI incidence was 0.619%. After the intervention initiation, there were two HAPI occurrences out of 738 patient admissions during the months of October, November, and December 2021. The post-intervention HAPI incidence was 0.271%. Therefore, a decrease in HAPI occurrences was clinically observed after the turn clock intervention was initiated. According to the Two-Proportions *z*-test, the difference in pre-intervention HAPI incidence and post-intervention HAPI incidence is not statistically significant based on an alpha of .05, z=1.04, p=.299, and confidence interval (CI) of 95.00% (see Table 3). The incidence z-score showed the results were one standard deviation away from significance. Though statistical significance was not met, a clinical significance of three fewer HAPI occurrences was observed in the post-intervention timeframe and a trend toward a decrease in HAPI incidence.

Turning Compliance

Turning compliance was also examined for the individuals in the sample after initiation of the turn clock intervention. Two participants were turned every 2 hours or twelve times during the 24-hour period, and 44 were turned less than twelve times during the 24-hour period (see Figure 1). As shown in Table 4, the population of the sample noted to have a turn clock used had an average number of turns of 7.00. Also shown in

Table 4, the population of the sample noted to have not used a turn clock had an average number of turns of 6.65. The differences in the number of turns occurring between the two groups exemplified the patients who did have a turn clock used were turned slightly more often than the patients without a turn clock used.

Discussion

Implementation of this QI effort did accomplish the purpose of decreasing HAPI incidence after initiating a turn clock method. However, the aim to decrease HAPI incidence to one HAPI occurrence over the three months was not met, though HAPI incidence did decrease to two HAPI occurrences during this QI effort. To answer the question of study, HAPI incidence did decrease, however, there was no statistical difference. Noncompliance of turning patients at high risk for developing a HAPI continued throughout this evidence-based pilot QI effort and, therefore, the UNPC reconvened to discuss how to implement other HAPI reducing strategies.

Limitations of the turn clock evidence-based pilot QI effort included a small sample size, continued noncompliance of turning patients every 2 hours, noncompliance with the turn clock intervention, and the COVID-19 pandemic creating staffing challenges. Additionally, not all charge nurses were able to document on the Epic report sheets whether the turn clock intervention was utilized for the qualifying patients. This limitation may have affected the results due to not having the information to report whether some patients' numbers of turns were affected by the turn clock use. Finally, the COVID-19 pandemic affected this QI effort through patients with COVID-19 were admitted to the general medicine floor and enhanced stress on the staff nurses staffing this floor. The patients with COVID-19 on this unit created high nursing turnover rates

and the utilization of nurses from other floors, float pool nurses, and agency nurses. The nurses who floated to the general medicine floor did not have the urgency or motivation to create positive change on the unit compared to the nurses who work in this setting each day.

The findings from the evidence-based pilot QI study and the limitations identified, the turn clock intervention motivated the members of UNPC to continue with the turn clock intervention by adding a turn team. As a result, the turn team effort is now in effect on the general medicine floor and thus far has been adopted well on the unit. These new HAPI reducing strategies are showing an increase in every 2 hour turning compliance. These strategies align with the literature recommendations and other successful pilots studied on similar medical hospital floors as observed in Cyriacks and Spencer's (2019) study.

Recommendations for future studies include utilizing a designated role to review, document, and ensure compliance with repositioning patients daily. If a staff member is designated to this role, then the repositioning of patients would be enhanced and observed more closely. The turn clock should be continued in QI efforts to increase every 2 hour turning compliance due to the clinical significance of decreased HAPI occurrences seen in this project. Strategies for maintaining and sustaining change include involving the charge nurses in ensuring every 2 hour turning is completed and documented. The charge nurses can oversee the staff nurses’ efforts each shift and help to maintain compliance with the turn team effort currently in place.

Conclusion

In this QI effort, the implementation of a turn clock in patients aged 60-years-old to 90-years-old with decreased mobility on a general medicine unit slightly increased the number of turns completed in 24 hours. Due to the small sample size in this project, future data collection should be analyzed for ongoing QI analysis. Specifically, the post-pilot data for the turn team pilot must be collected and reported to determine if clinical significance was achieved.

References

Agency for Healthcare Quality and Research. (2020). Declines in hospital-acquired conditions. Retrieved May 20, 2021, from https://www.ahrq.gov/data/infographics/hac-rates_2019.html

Centers for Disease Control and Prevention. (2017, May 15). *A Framework for Program Evaluation. https://www.cdc.gov/eval/framework/index.htm*

Chaboyer, W., Bucknall, T., Gillespie, B., Thalib, L., McInnes, E., Considine, J., Murray, E., Duffy, P., Tuck, M., & Harbeck, E. (2017). Adherence to evidence-based pressure injury prevention guidelines in routine clinical practice: A longitudinal study. *International Wound Journal*, *14*(6), 1290–1298. https://doi.org/10.1111/iwj.12798

Cyriacks, B., & Spencer, C. (2019). Reducing HAPI by cultivating team ownership of prevention with budget-neutral turn teams. *MEDSURG Nursing*, *28*(1), 48–52.

Dalvand, S., Ebadi, A., & Gheshlagh, R. G. (2018). Nurses' knowledge on pressure injury prevention: A systematic review and meta-analysis based on the Pressure ulcer knowledge assessment tool. *Clinical, Cosmetic and Investigational Dermatology*, *11*, 613–620. https://doi.org/10.2147/CCID.S186381

De Meyer, D., Van Hecke, A., Verhaeghe, S., & Beeckman, D. (2019). PROTECT - Trial: A cluster RCT to study the effectiveness of a repositioning aid and tailored repositioning to increase repositioning compliance. *Journal of Advanced Nursing*, *75*(5), 1085–1098. https://doi.org/10.1111/jan.13932

European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel, and Pan Pacific Pressure Injury Alliance. (2019). *Prevention and treatment of*

pressure ulcers/injuries: Quick reference guide. The International Guideline. https://www.internationalguideline.com/static/pdfs/Quick_Reference_Guide-10Mar2019.pdf

Gaspar, S., Peralta, M., Marques, A., Budri, A., & Gaspar de Matos, M. (2019). Effectiveness on hospital-acquired pressure ulcers prevention: A systematic review. *International Wound Journal*, *16*(5), 1087–1102. https://doi.org/10.1111/iwj.13147

Gillespie, B. M., Walker, R. M., Latimer, S. L., Thalib, L., Whitty, J. A., McInnes, E., & Chaboyer, W. P. (2020). Repositioning for pressure injury prevention in adults. *Cochrane Database of Systematic Reviews, 6*(CD009958), 1-65. DOI: 10.1002/14651858.CD009958.pub3.

Gupta, P., Shiju, S., Chacko, G., Thomas, M., Abas, A., Savarimuthu, I., Omari, E., Al-Balushi, S., Jessymol, P., Mathew, S., Quinto, M., McDonald, I., & Andrews, W., (2020). A quality improvement programme to reduce hospital-acquired pressure injuries. *BMJ Open Quality,* 1-9. http://dx.doi.org/10.1136/bmjoq-2019-000905

Intellectus Statistics [Online computer software]. (2021). Intellectus Statistics. https://analyze.intellectusstatistics.com/

Iowa Model Collaborative. (2017). Iowa model of evidence-based practice: Revisions and validation. *Worldviews on Evidence-Based Nursing, 14*(3), 175-182. doi:10.1111/wvn.12223

Jiang, L., Li, L., & Lommel, L. (2020). Nurses' knowledge, attitudes, and behaviours related to pressure injury prevention: A large-scale cross-sectional survey in

mainland China. *Journal of Clinical Nursing (John Wiley & Sons, Inc.)*, *29*(17/18), 3311–3324. https://doi.org/10.1111/jocn.15358

Lovegrove, J., Fulbrook, P., & Miles, S. (2020). Relationship between prescription and documentation of pressure injury prevention interventions and their implementation: An exploratory, descriptive study. *Worldviews on Evidence-Based Nursing*, *17*(6), 465–475. https://doi.org/10.1111/wvn.12473

Padula, W. V., & Delarmente, B. A. (2019). The national cost of hospital-acquired pressure injuries in the United States. *International Wound Journal*, *16*(3), 634–640. https://doi.org/10.1111/iwj.13071

Rondinelli, J., Zuniga, S., Kipnis, P., Kawar, L. N., Liu, V., & Escobar, G. J. (2018). Hospital-acquired pressure injury: Risk-adjusted comparisons in an integrated healthcare delivery system. *Nursing research*, *67*(1), 16–25. https://doi.org/10.1097/NNR.0000000000000258

Shieh, D. C., Berringer, C. M., Pantoja, R., Resureccion, J., Rainbolt, J. M., & Hokoki, A. (2018). Dramatic reduction in Hospital-Acquired Pressure Injuries using a pink paper reminder system. *Advances in Skin & Wound Care*, *31*(3), 118–122. https://doi.org/10.1097/01.ASW.0000527966.72494.61

Wassel, C. L., Delhougne, G., Gayle, J. A., Dreyfus, J., & Larson, B. (2020). Risk of readmissions, mortality, and hospital-acquired conditions across hospital-acquired pressure injury (HAPI) stages in a US national hospital discharge database. *International Wound Journal*, *17*(6), 1924–1934. https://doi.org/10.1111/iwj.13482

Table 1

Frequency Table for Demographic Characteristics

Variable	*n*	*%*
Gender		
Male	20	43.48
Female	26	56.52
Missing	0	0.00
Race		
White	36	78.26
No Data	1	2.17
Black	7	15.22
Non-Hispanic	1	2.17
Other	1	2.17
Missing	0	0.00
Mobility		
Red	24	52.17
Orange	22	47.83
Missing	0	0.00

Note. Output obtained using *Intellectus Statistics*

Table 2

Summary Statistics Table for Demographic Characteristics

Variable	*M*	*SD*	*n*	SE_M	Min	Max	Skewness	Kurtosis
Age	75.67	8.95	46	1.32	60.00	90.00	-0.07	-0.99
Braden Score	14.89	2.38	46	0.35	9.00	18.00	-0.55	-0.15
LOS Measured in Days	13.96	13.70	46	2.02	1.00	63.00	1.94	3.65

Note. Output obtained using *Intellectus Statistics*

Table 3

Two Proportions z-Test for the Difference between Pre-Intervention and Post-Intervention

Samples	Responses	*n*	Proportion	*SD*	*SE*
Pre-Intervention	5	807	.006	0.08	0.003
Post-Intervention	2	738	.003	0.05	0.002

Note. $z = 1.04$, $p = .299$, 95.00% CI: [-.003, .01]

Table 4

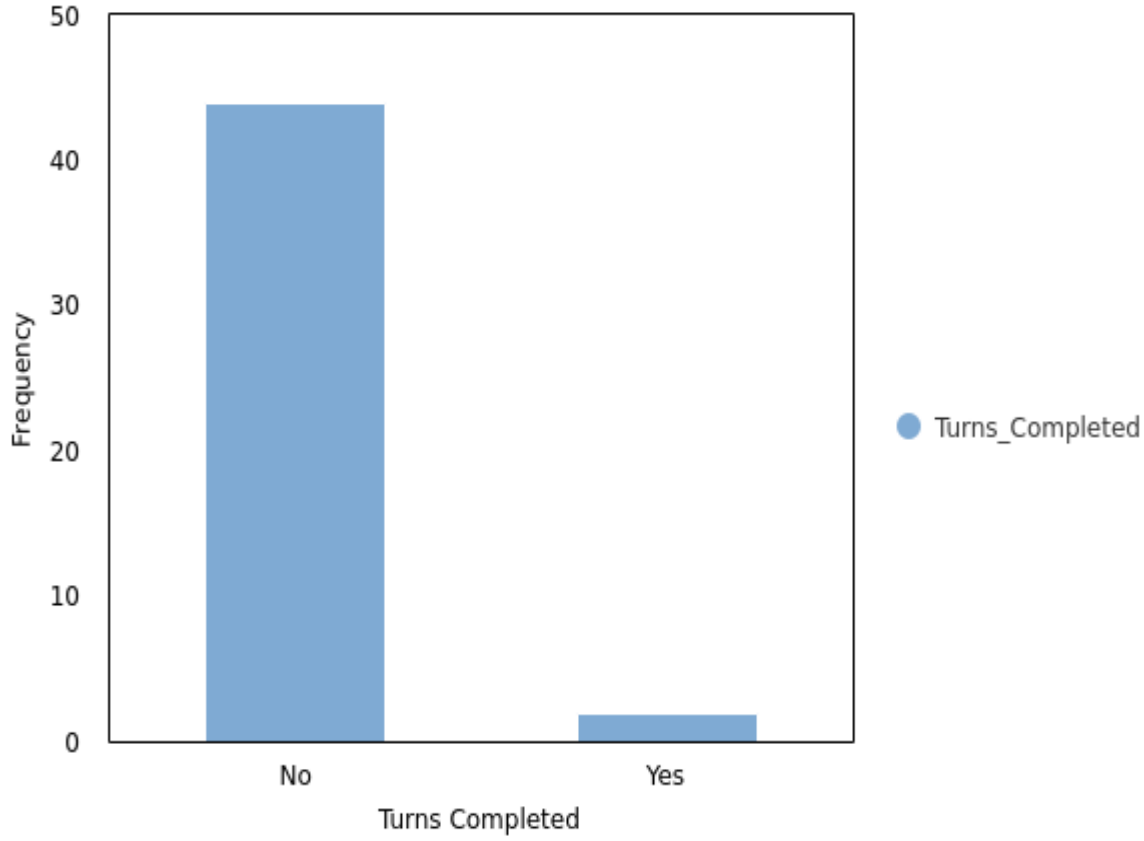
Mean, Standard Deviation, and Sample Size for Turning Compliance by Turn Clock Used

Combination	*M*	*SD*
No	6.65	3.36
Yes	7.00	2.33

Note. Output obtained using *Intellectus Statistics*

Figure 1

Barplot of Turns Completed



Appendix A

Excel Spreadsheet for Data Collection Instrument

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Participant #	Braden Score	Age	Gender	Race	Mobility	Diagnosis	Comorbidities	LOS (Measured in Days)	Turn Clock Used	Other interventions	Turns Completed	Turning Compliance	HAPI occurrence	Pre/Post Turn Clock	
2	100920211	11	73	1	1	4	1	1, 2, 3, 4, 6	20	2	1	2	6	2	3	
3	100920212	14	69	2	1	3	2	7	41	2	1	2	5	2	3	
4	100920213	13	77	2	1, 4	2	3	10, 12, 13	19	1	1	2	4	1	1	
5	100920214	15	78	1	7	4	4	1, 2, 5, 7, 10, 11, 12, 13	11	1	1	2	8	2	1	
6	100920215	12	79	2	1, 4	4	5	10, 12	17	1	1	2	8	2	1	
7	101320216	9	89	2	1, 4	3	7	13	6	1	4	2	10	2	1	
8	101620217	14	75	1	1, 4	3	6	1, 3, 6, 11	13	2	5	2	11	2	3	
9	101620218	17	69	2	2, 4	3	8	1, 6, 9, 13	2	2	5	2	10	2	3	
10	101620219	17	86	2	1, 4	3	6	1, 4, 7, 8	56	1	1, 2	2	9	2	1	
11	1021202110	15	90	2	1, 4	4	7	11, 12	5	3	4	2	7	2	3	
12	1023202111	17	87	2	4, 6	3	2	1, 2	12	1	1, 2	2	5	2	1	
13	1023202112	18	87	2	1, 4	3	9	1, 2, 7, 10, 11	5	2	1	2	6	2	3	
14	1023202113	13	85	1	1, 4	4	9	7, 11, 12, 13	23	2	1, 2, 4	2	10	2	3	
15	1023202114	18	62	1	1, 4	4	8	1, 3, 5, 7, 8, 9, 12	63	2	1, 4	2	10	2	2	
16	1026202115	18	77	1	1, 4	3	1	1, 4, 6, 7, 11, 12	12	3	1, 2	2	3	2	3	
17	1026202116	15	60	2	1, 4	4	8	7	25	3	1, 2, 4	1	12	2	3	
18	1101202117	14	79	2	1, 4	3	9	1, 2, 3, 7, 11	4	3	1, 2	2	9	2	3	
19	1104202118	11	66	2	1, 4	4	10	1, 11	2	3	2	2	6	2	3	
20	1104202119	15	61	1	1, 4	4	6	11	6	3	1	2	10	2	2	
21	1104202120	12	63	2	1, 4	4	6	1, 3, 5, 8, 11	26	3	1, 2	2	6	2	2	
22	1106202121	18	76	2	1, 4	3	2	1, 2, 3, 5, 7, 11	6	2	1, 2	2	9	2	3	
23	1106202122	18	67	2	1, 4	3	2	1, 2, 3, 4, 6	5	2	5	2	3	2	3	
24	1106202123	15	75	2	1, 4	4	2	1, 2, 11	3	2	1, 2	2	11	2	2	
25	1107202124	16	75	2	2, 4	3	11	1, 2, 5, 7	6	2	1	2	6	2	3	
26	1109202125	14	74	1	2, 4	4	12	1, 2, 4, 5, 8, 12	10	1	1	2	8	2	1	
27	1112202126	16	90	2	1, 4	3	12	4, 11	3	2	5	2	5	2	3	
28	1112202127	13	70	2	2, 4	4	2	1, 2, 3, 5, 8	41	2	1, 2	2	9	2	2	
29	1113202128	18	78	1	1, 4	4	12	2, 4, 6, 7, 11, 12	1	2	1	2	3	2	3	
30	1113202129	14	81	1	1, 4	3	13	1, 2, 3, 10, 11	8	2	5	2	6	2	3	
31	1114202130	18	78	1	1, 4	4	1	1, 2, 3, 4, 10	6	2	1, 2	1	12	2	2	
32	1117202131	14	86	2	2, 4	4	7	1, 11, 12	17	2	5	2	5	2	2	
33	1118202132	15	62	1	4	4	2	1, 2, 3, 4, 6	4	1	5	2	4	2	1	
34	1125202133	14	76	1	1, 4	3	9	3, 7	22	3	1	2	9	2	3	
35	1125202134	17	60	2	1, 4	3	8	1, 2, 3, 7, 9	13	3	1	2	8	2	3	
36	1125202135	15	67	1	1, 4	4	2	1, 2, 11	9	3	1	2	2	2	2	
37	1130202136	9	89	2	1, 4	4	12	1, 2, 4, 11, 12	8	3	1, 2, 4	2	8	2	3	
38	1202202137	17	73	2	1, 4	3	14	5, 12	9	3	1, 2	2	8	2	3	
39	1202202138	16	72	1	2, 4	3	9	1, 2, 4, 7	4	3	1	2	10	2	3	
40	1204202139	17	68	2	1, 4	3	4	1, 7, 8, 9, 12	20	3	1	2	4	2	3	
41	1211202140	15	64	1	1, 4	4	13	1, 3, 5, 7, 8	10	2	1	2	3	2	3	
42	1211202141	13	77	1	1, 4	4	9	1, 4, 5, 7, 12	31	2	1, 2, 4	2	1	2	2	
43	1212202142	16	81	2	1, 4	4	1	1, 2	6	2	1	2	2	2	3	
44	1215202143	14	72	2	1, 4	4	2	1, 2, 4, 11, 12, 13	3	3	1	2	8	2	3	
45	1217202144	12	86	1	1, 4	4	13	1, 2, 3, 7, 12, 13	12	3	1	2	9	2	2	
46	1226202145	15	83	1	2, 4	3	4	1, 3, 4, 5, 12	12	3	1, 2	2	8	2	3	
47	1226202146	18	89	1	1, 4	3	12	1, 10, 12	5	3	5	2	5	2	3	

Appendix B

Excel Spreadsheet for HAPI Incidence Data Collection

	A	B	C	D	E	F	G	H
1								
2	Row Number	Pre-Intervention Date	HAPI occurrences	Number of Patient Admissions	Post-Intervention Date	HAPI occurrences	Number of Patient Admissions	
3	1	Jun-21	1	247	Oct-21	1	241	
4	2	Jul-21	1	321	Nov-21	0	226	
5	3	Aug-21	3	239	Dec-21	1	271	
6	4							
7	5							
8	6							
9	7							
10	8							
11	9							
12								
13								
14		Pre-Intervention Incidence= 5/807x100= 0.619%			Post-Intervention Incidence= 2/738x100=0.271%			
15								

Appendix C

Institution IRB Approval Letter

Missouri Baptist MEDICAL CENTER | BJC HealthCare

February 01, 2022

Sydney Warren, RN
3015 N. New Ballas Road
St. Louis, MO 63131

RE: # 1184

Protocol Title: Effect of a Turn Clock on Hospital-Acquired Pressure Injury Incidence

Dear Sydney:

This is to advise you that the above-referenced study has been presented to the Missouri Baptist Medical Center Institutional Review Board. The following action was taken:

IRB Meeting Date:	02/01/2022
IRB Action:	Approved
Explanation/Comments:	Because this is a minimal risk study, expedited review and approval is allowed.

Changes in approved research during the period for which the MBMC IRB approval has already been given may not be initiated without IRB review and approval except where necessary to eliminate apparent immediate hazards to human subjects. (Please refer to MBMC IRB SOP #4).

Kindest Regards,

Tiffany Hamilton
Tiffany Hamilton, MBA, RHIA, CHRC, ACRP-CP
IRB Administrator

3015 N. Ballas Road • St. Louis, Missouri, 63131 • 314-996-5000 • missouribaptist.org